# OUSSAMA BATOUCHE

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## ABOUT

I'm a Data Scientist at HUCC and final-year PhD candidate at the University of Helsinki, specialising in machine learning, image processing, and statistical modelling applied to science and healthcare data. With 5+ years' experience, I'm fluent in Python and R and skilled in Bayesian statistics, deep learning, and data engineering. In my current role, I design, develop, and optimize models to analyse Prostate Cancer (PCa) clinical and imaging data to predict survival outcomes.

## EXPERIENCE

- **University of Helsinki [🌐]**  *01.2022 - Present*
  *Data Scientist*  Helsinki, Finland
  ◦ Developed a data imputation algorithm to handle missing time series PCa data, improving dataset completeness by 25%.
  ◦ Wrangled  300GB of Cancer data to conduct survival analysis, hypothesis testing, and machine learning training on 4000+ PCa patients.
  ◦ Contributed to the development of HistoEncoder, a digital pathology foundation model for Prostate Cancer.
  ◦ Presented technical solutions at international conferences and collaborated with international research teams.

- **Georgia Tech & Emory University [🌐]**  *04.2024 - 05.2024*
  *Visiting Researcher (Machine Learning & Image Analysis)*  Atlanta, GA, USA
  ◦ Engineered an image analysis pipeline to extract features from 40,000+ histopathology images (WSI), processing 20TB in 4 HPC servers and 16 GPUs.
  ◦ Developed a multi-centre (FI, USA, JP) ML model to predict Prostate Cancer outcome, achieving 88% accuracy with an XGBoost after hyper-parameter optimisation using *Optuna*.
  ◦ Optimized feature selection methods, including preparation-induced instability (PI) score and latent instability (LI) score, to quantify feature instability across and within datasets.

- **King Abdullah University of Science and Technology (KAUST) [🌐]**  *02.2024*
  *Visiting Researcher (Statistical Modelling)*  Thuwal, Saudi Arabia
  ◦ Built a Bayesian statistical model using INLAjoint R package to assess the Prostate Cancer treatment timing effect on future outcomes.
  ◦ Developed a Bayesian model to predict metastatic cases in Prostate cancer using INLA methodology and INLAjoint package.

- **Aalto University [🌐]**  *02.2020 - 12.2021*
  *Research Assistant (Machine Learning Engineering)*  Espoo, Finland
  ◦ Developed a full-stack framework for real-time object detection from live video streaming, deployed on Nvidia Jetson GPUs.
  ◦ Optimised edge-based parallel detection system, achieving 90% accuracy and reduced latency by 30%.
  ◦ Contributed to a European project, focusing on scalable software solutions.

## SKILLS

- **Languages:** English (Fluent), Swedish (Elementary), French (Fluent), Arabic (Native)
- **Programming:** Python, R, Bash, SQL, JavaScript, TypeScript
- **Data Science & Machine Learning:** Supervised and Unsupervised Machine Learning, Deep learning, TensorFlow, PyTorch, Image processing, Statistics, Time series, Hypothesis testing, Survival analysis
- **Cloud & Virtualisation:** Microsoft Azure, Azure ML, Google Cloud, Docker, Kubernetes
- **Web Technologies and Databases:** Django, NodeJS, REST APIs, MySQL, PostgreSQL, MongoDB
- **Other Tools:** Git, Parallel Programming (Ansible, Slurm), CI/CD Pipelines (Jenkins, Travis CI)

## EDUCATION

- **University of Helsinki**  *08.2022 - 07.2026*
  *PhD in Data Science*  Helsinki, Finland
- **University of Science and Technology Houari Boumediene (USTHB)**  *09.2018 - 09.2020*
  *Master's in Data Science*  Bab Ezzouar, Algeria
- **University of Science and Technology Houari Boumediene (USTHB)**  *09.2015 - 06.2018*
  *Bachelor's in Computer Science and Mathematics*  Bab Ezzouar, Algeria

**[S.3]** Batouche, et al. (202-). **AI-driven tumor microenvironment quantification in H&E predicts adverse pathology in intermediate risk Prostate Cancer patients** . Manuscript under submission. Preprint available upon request.

**[J.2]** Batouche, et al. (2026). **A joint frailty model to assess the relationship between time to curative treatment and biochemical recurrence in prostate cancer patients**. In *Informatics in Medicine Unlocked*, 60, 101727, 2026. DOI: 10.1016/j.imu.2025.101727.

**[J.1]** Batouche, et al. (2025). **Comparable recurrence risk for MRI-detected Gleason Grade Group (GG) 2 and systematic biopsy-detected GG1 prostate cancer**. In *BJU International*. DOI: 10.1111/bju.70109.

**[A.4]** Batouche, et al. (2025). **Computational pathology–based classifier for predicting Gleason grade group upgrading on radical prostatectomy from diagnostic biopsies**. In the *Journal of Clinical Oncology*, 43, 329-329. 2025 ASCO Genitourinary Cancers Symposium, 13-15 February 2025, San Francisco, CA. DOI: 10.1200/JCO.2025.43.-5_suppl.329.

**[S.2]** Pohjonen, Batouche, et al. (2024). **HistoEncoder: a digital pathology foundation model for prostate cancer**. DOI: 10.48550/arXiv.2411.11458.

**[A.3]** Batouche, et al. (2024). **Joint modelling to assess the relationship between time to curative treatment and treatment recurrence in Prostate Cancer patients**. In *European Urology Open Science*, 63, S12-S13. 9th Baltic Meeting in conjunction with the EAU, 24-25 May 2024, Tallinn, Estonia. ISSN 2666-1683. DOI: 10.1016/S2666-1683(24)00424-5.

**[A.2]** Batouche, et al. (2024). **Preliminary evidence of Gleason grade inflation in prostate cancer: A pre-treatment study**. In *European Urology Open Science*, 63, S14. 9th Baltic Meeting in conjunction with the EAU, 24-25 May 2024, Tallinn, Estonia. ISSN 2666-1683. DOI: 10.1016/S2666-1683(24)00425-7.

**[S.1]** Batouche, et al. (2024). **MRI-Targeted Prostate Biopsy Introduces Grade Inflation and Overtreatment for Gleason Grade Group 2 cancers**. PMID: 38260466; PMCID: PMC10802666. DOI: 10.1101/2024.01.10.24300922. Updated version published in *BJU International* at DOI: 10.1111/bju.70109.

**[C.1]** Batouche, et al. (2024). **Synergizing Data Imputation and Electronic Health Records for Advancing Prostate Cancer Research: Challenges, and Practical Applications** . In *Proceedings of the 17th International Joint Conference on Biomedical Engineering Systems and Technologies - HEALTHINF*, ISBN 978-989-758-688-0; ISSN 2184-4305, 77-86, SciTePress, 2024, Rome, Italy. DOI: 10.5220/0012350300003657

**[A.1]** Batouche, et al. (2023). **Prognostic impact of prostate cancer grade inflation in targeted biopsies**. In *European Urology*, 83, S1371-S1372. Abstracts EAU23 - 38th Annual EAU Congress. ISSN 0302-2838. DOI: 10.1016/S0302-2838(23)00998-3.

## GRANTS AND AWARDS

- **University Grant**                                                                                      *09.2024*
  *University of Helsinki (Doctoral School)*
  ∘ I have received a travel grant to participate in ASCO GU conference, San Francisco, CA, USA.

- **Best presentation award**                                                                              *05.2024*
  *European association of urology*                                                                        [🌐]
  ∘ I gave a talk at the 9th EAU Baltic meeting, Tallinn, Estonia, on our work focused on joint models
  ∘ The talk was followed by a poster presentation
  ∘ Our work was awarded the 2nd best presentation at the conference.

- **University Grant**                                                                                      *03.2024*
  *University of Helsinki (Doctoral School)*
  ∘ I have received a travel grant to participate in the International Joint Conference on Biomedical Engineering Systems and Technologies, Rome, Italy.

- **University Grant**                                                                                      *03.2023*
  *University of Helsinki (Doctoral Programme in Computer Science)*
  ∘ I have received a travel grant to attend the Oxford Machine Learning Summer School in Oxford, UK.